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ABSTRACT

This module, one in a series of competency-based administrator instructional packages, focuses on a specific competency that vocational education administrators need to be successful in the area of instructional management. The purpose of the module is to provide administrators with information about the scheduling process by citing tools, priorities, and procedures common to many scheduling systems. An introduction provides terminal and enabling objectives, a list of resources needed, and a glossary of selected terms. The main portion of the module includes three sequential learning experiences. Overviews, which precede each learning experience, contain the objective for each experience and a brief description of what the learning experience involves. Each learning experience consists of a number of activities that may include information sheets, case studies, samples, checklists, and self-checks. Optional activities are provided. The final learning experience also provides an assessment form for administrator performance evaluation by a resource person. (YLB)

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ED226242

Manage the Development of Master Schedules

MODULE
LT-B-3

Module LT-B-3 of Category B—
Instructional Management

COMPETENCY-BASED VOCATIONAL EDUCATION ADMINISTRATOR MODULE SERIES

Consortium for the Development of Professional Materials for Vocational Education

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The National Center for Research in Vocational Education
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The work presented herein was performed by the National Center for Research in Vocational Education on behalf of the Consortium for the Development of Professional Materials for Vocational Education. Sponsors and members of the Consortium for 1981-1982 included the following states and/or cooperating agencies: the Arizona Department of Education, Vocational Education Division, and Northern Arizona University, the Center for Vocational Education; the Florida Department of Education, Division of Vocational Education, and Florida International University; the Illinois State Board of Education, Department of Adult, Vocational, and Technical Education, and Southern Illinois University at Carbondale; the Michigan Department of Education, Vocational-Technical Education Services, and Michigan State University; the Ohio State Department of Education, Division of Vocational Education; and the Pennsylvania Department of Education, Bureau of Vocational Education, and Temple University, Department of Vocational Education. The opinions expressed herein do not, however, necessarily reflect the position or policy of any of the sponsors, and no official endorsement by them should be inferred.

FOREWORD

The need for competent administrators of vocational education has long been recognized. The rapid expansion of vocational education programs and increased student enrollments have resulted in a need for increasing numbers of vocational administrators at both the secondary and postsecondary levels. Preservice and inservice administrators need to be well prepared for the complex and unique skills required to successfully direct vocational programs.

The effective training of local administrators has been hampered by the limited knowledge of the competencies needed by local administrators and by the limited availability of competency-based materials specifically designed for the preparation of vocational administrators. In response to this pressing need, the Occupational and Adult Education Branch of the U.S. Office of Education, under provisions of part C--Research of the Vocational Education Amendments of 1968, funded the National Center for a scope of work entitled "Development of Competency-Based Instructional Materials for Local Administrators of Vocational Education" during the period 1975-77. That project had two major objectives:

1. To conduct research to identify and nationally verify the competencies considered important to local administrators of vocational education.
2. To develop and field test a series of prototypic competency-based instructional packages and a user's guide. One hundred sixty-six (166) high priority competencies were identified and six prototypic modules and a user's guide were developed, field tested, and revised.

Although six modules had been developed, many more were needed to have competency-based materials that would address all the important competencies that had been identified and verified. In September 1978 several states joined with the National Center for Research in Vocational Education to form the Consortium for the Development of Professional Materials for Vocational Education. Those states were Illinois, Ohio, North Carolina, New York, and Pennsylvania. The first five states were joined by Florida and Texas later in the first year and by Arizona and Michigan in the fourth year (1981-82). The first objective of the Consortium was to develop and field test additional competency-based administrator modules of which this is one.

Several persons contributed to the successful development and field testing of this module on managing the development of master schedules. Carol J. Spencer, Graduate Research Associate, assumed the major responsibility for reviewing the literature and for preparing the actual manuscript. Recognition also goes to the two consultants who helped conceptualize the module and prepared draft materials for the manuscript: Lionel G. Drechsel, Vocational and Planning Director, Ogden City School District, Ogden, Utah; and Don Fisher, Assistant Dean of Instruction, Los Angeles Trade-Technical College, Los Angeles, California.

Acknowledgement is given to the official reviewers who provided critiques of the module and suggestions for its improvement: Rodger J. Eckhardt, Vice-President for Academic Affairs, Glen Oaks Community College, Centreville, Michigan; and Marvin L. Oberlander, Associate Principal, Mt. Pleasant High School, Mt. Pleasant, Michigan.

Credit goes to Carol J. Spencer, Graduate Research Associate, and Lois G. Harrington, Program Associate, who helped to refine the module for publication after field testing; and to Robert E. Norton, Consortium Program Director, for providing program leadership and content reviews. Thanks go to Ferman B. Moody, Associate Director for Personnel Development, for his administrative assistance.

Appreciation is also extended to Barbara Border, Bill Cisco, Calvin Cotrell, Carroll Curtis, James Haire, Robert Kerwood, George Kosbab, Helen Lipscomb, Aaron J. Miller, Dominic Mohamed, James Parker, Wayne Ramp, and Ray Ryan for their service as state representatives, state department contacts, and field-test coordinators; and to the other teacher educators and local administrators of vocational education who used the modules and provided valuable feedback and suggestions for their improvement. Last, but certainly not least, thanks and credit are due Deborah Linehan, Consortium Program Secretary, for her patience and expert skill in processing the many words necessary to make this module a quality document.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

INTRODUCTION

Master schedules can provide the structure that pulls together the multitude of courses and labs offered by your school or college. It can make sense and order out of confusion. Constructing a master schedule can call upon all the skills possessed by an experienced administrator. Inexperienced administrators are often at a distinct disadvantage.

There are two possible routes to take when addressing master schedule construction. If the institution has an existing schedule that works, revision and updating may be all that is needed. However, if the institution is new or the existing schedule has major problems, the administrator is faced with establishing a master schedule from scratch.

The process of designing or revising a master schedule must be preceded by the gathering of information about several facets of the institution. Identification of course offerings must precede any effort to design a schedule. The scheduler also needs to have information about faculty, equipment, and facilities. The schedules of comprehensive, area vocational-technical, and postsecondary schools each have unique characteristics that must be examined before construction or revision of the schedule begins.

After the scheduler has a strong background of information, a schedule must be drafted. The scheduler has responsibility for developing a master plan that provides the classes requested by students, with qualified teachers and appropriate rooms assigned to these classes. The scheduler must realize that there is no such thing as the "perfect" schedule. There will always be the student who "must" have the two classes that can only be scheduled opposite each other. The trick is to minimize conflicts and provide maximum flexibility to meet the needs of the greatest number of students and faculty.

It is not the purpose of this module to provide in-depth coverage of the scheduling process, with all the details and forms. Such a task is not feasible because there is such a large variety of scheduling processes and institutional settings involved that no one process can be considered the best or the right one for all situations. Some institutions use the traditional six 60-minute periods or eight 45-minute periods for a six-hour instructional day. Others use modified traditional scheduling, flexible scheduling, modular scheduling, or possibly flexible modular scheduling. Some institutions do their scheduling by hand, some use mechanical systems, and some use computer systems. Many scheduling systems have special forms and mechanical processes that must be used to be compatible with that system. It is not the purpose here to describe these various systems, but rather to provide a working knowledge of the general process by citing some tools, priorities, and procedures common to many of the scheduling systems.

This module is designed to provide the new administrator, or the administrator inexperienced in scheduling, with information about the scheduling process. This module can be used most effectively when there is an experienced administrator to help guide the scheduling process.

Module Structure and Use

This module contains an introduction and three sequential learning experiences. Overviews, which precede each learning experience, contain the objective for each experience and a brief description of what the learning experience involves.

Objectives

Terminal Objective: While working in an actual administrative situation, manage the development of master schedules. Your performance will be assessed by your resource person, using the "Administrator Performance Assessment Form," pp. 43-44. (Learning Experience III)

Enabling Objectives:

1. After completing the required reading, demonstrate knowledge of factors that influence the design of a master schedule. (Learning Experience I)
2. After completing the required reading, interpret a conflict matrix, identify errors in a given master schedule, and develop a plan for resolving the identified discrepancies. (Learning Experience II)

Resources

A list of the outside resources that supplement those contained within the module follows. Check with your resource person (1) to determine the availability and the location of these resources, (2) to locate additional references specific to your situation, and (3) to get assistance in setting up activities with peers or observations of skilled administrators.

Learning Experience I

Optional

- AN ADMINISTRATOR experienced in scheduling whom you can interview.

Learning Experience II

Optional

- SAMPLE MASTER SCHEDULES that you can review and analyze.
- A COMMERCIAL DATA SYSTEMS CONSULTANT who provides scheduling assistance to schools whom you can interview.

Learning Experience III

Required

- AN ACTUAL ADMINISTRATIVE SITUATION in which, as part of your duties, you can manage the development of master schedules.
- A RESOURCE PERSON to assess your competency in managing the development of master schedules.

Selected Terms

Administrator--refers to a member of the secondary or postsecondary administrative team. This generic term, except where otherwise specified, refers to the community college president, vice-president, dean, or director; or to the secondary school principal, director, or superintendent.

Board--refers to the secondary or postsecondary educational governing body. Except where otherwise specified, the term "board" is used to refer to a board of education and/or a board of trustees.

Institution--refers to a secondary or postsecondary educational agency. Except where otherwise specified, this generic term is used to refer synonymously to secondary schools, secondary vocational schools, area vocational schools, community colleges, postsecondary vocational and technical schools, and trade schools.

Resource Person--refers to the professional educator who is directly responsible for guiding and helping you plan and carry out your professional development program.

Teacher/Instructor--these terms are used interchangeably to refer to the person who is teaching or instructing students in a secondary or postsecondary educational institution.

User's Guide

For information that is common to all modules, such as procedures for module use, organization of modules, and definitions of terms, you should refer to the following supporting document:

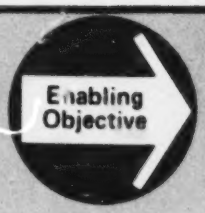
> Guide to Using Competency-Based Vocational Education Administrator Materials. Columbus, OH: The Center for Vocational Education, The Ohio State University, 1977.

This module addresses task statement number 37 from Robert E. Nort[illegible]et al., The Identification and National Verification of Competencies Import[illegible]Secondary and Post-Secondary Administrators of Vocational Education (Co[illegible]mbus, OH: The Center for Vocational Education, The Ohio State University, 1977). The 166 task statements in this document, which were verified as important, form the research base for the National Center's competency-based administrator module development.

NOTES

Learning Experience I

OVERVIEW

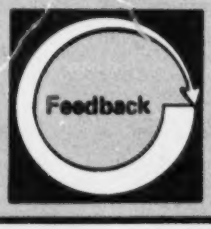


After completing the required reading, demonstrate knowledge of factors that influence the design of a master schedule.

You will be reading the information sheet, "Factors Influencing the Design of a Master Schedule," pp. 9-15.

You may wish to arrange through your resource person to meet with an experienced administrator and interview this person about his/her experiences in developing master schedules.

You will be demonstrating knowledge of factors that influence the design of a master schedule by completing the "Self-Check," pp. 17-18 .



You will be evaluating your competency by comparing your completed "Self-Check" with the "Model Answers," pp. 19-20.

NOTES

For information about the factors that influence the design and development of a master schedule, read the following information sheet.

FACTORS INFLUENCING THE DESIGN OF A MASTER SCHEDULE

Preparing a master schedule requires you, the administrator, to gather a large amount of information, analyze that information in light of your institution's philosophy and needs, and then arrange the information into a systematic description including the assignment of courses offered, students' assignments, staff assignments, and facility usage. The workability of those assignments is, to a large extent, determined by how well you gather and analyze the information you need before you start building the actual schedule.

The scheduling process is cyclical. You start with a tentative schedule, gather data, finalize a master schedule, and use that schedule as a basis for planning your tentative schedule for the next year or term. You will probably not be drafting an entirely new schedule from scratch, nor will you know all the facts when you develop your initial, tentative schedule.

Information you will need generally falls into four categories: courses, students, staff, and buildings and equipment. You probably know some of the information you'll need, and you may know where to look for the remaining information. The trick is to systematically collect and examine your information throughout the scheduling process.

Every secondary and postsecondary school and every scheduling situation is unique. In the information presented here, reference will be made to comprehensive high schools, area vocational schools, and community and technical colleges. There are some differences in the scheduling needs of these three types of institutions, which are highlighted at appropriate times. As you read this information sheet, keep in mind the type of institution in which you are or will be working. Remember, data gathering is constant, rather than happening only during the month allotted for master schedule development.

Courses

You should consider each of the following questions about courses before constructing your new master schedule:

- What courses are program requirements or prerequisites?

  In developing the tentative master schedule, you will need to know what courses must be offered so that students can meet the requirements for completing each vocational program. Therefore, it will be essential for you to be thoroughly familiar with program requirements. For example, most students will need to take certain general education

courses, e.g., English, mathematics, and science. Consequently, it will be necessary for you to coordinate the scheduling of vocational education and general education courses. In addition to general education courses, students may be required to participate in laboratory sessions, on-the-job training, and other such experiences designed for vocational students. Your scheduling must also take these requirements into account.

Furthermore, since most vocational programs are two years in length, you must ensure that required courses are offered at least once during the two-year cycle. Attention must also be devoted to ensuring that courses that are prerequisites to required courses are offered on a regular basis.

- Are there blocks of courses--courses that are always taught back to back?

  In some cases, related course work is taught in the same time block as the skill classes. This makes scheduling easier, so be sure to note "blocks." You also need to know about blocks in order to help work academic courses around vocational "blocks." For example, the food service program may require all students to participate in a nutrition class during first period and supervised lab experience during their and fourth period. Students must register for this three period block.

Students

You should be able to answer each of the following questions in order to describe the students your institution serves:

- How many students will enroll?

  The number of students who eventually preregister or register for a given course is a critical factor in two respects. First, whether a course is offered at all usually depends upon the number of students who have registered for the course. There should be a sufficient number of students enrolled so that the course will be cost-efficient. While the enrollment of fewer than an adequate number of students may be tolerated under certain circumstances, inadequate enrollments will eventually prove to be economically unacceptable. Second, the number of students enrolled also dictates how many sections of the course you will need to offer, contingent of course on instructor and facility availability.

  You cannot predict exactly how many students will be enrolled because, until all registration is completed, you have no commitment from prospective students. In postsecondary schools, there may be rigid limits on the number of students in any given program at one time, or there may be an open-entry/open-exit policy that allows more fluctuation in enrollment. Secondary area vocational schools depend on feeder schools for their students. In comprehensive high schools, the vocational programs may be competing with the academic programs for students.

(Scheduling can minimize some competition here by not placing the most attractive or required nonvocational courses in the same time block as the vocational courses.)

To best estimate the number of students you will be scheduling, you will need to examine numbers of students in previous enrollment populations. There are several ways to do this, including (1) constructing and interpreting a line graph of "admissions/registration progress data" (see sample 1); (2) adjusting last year's figures using factors such as population shifts, economic conditions, or vocational outlooks; or (3) examining enrollments in "feeder" or prerequisite courses (for example, the enrollment for advanced accounting can reasonably be calculated knowing the enrollment in intermediate accounting, as well as attrition rates).

- How many student spaces are available?

You need to check your ongoing program enrollments to determine how many students are being accommodated at present. Then ask the following kinds of questions: Are there instructors who are overloaded? Underloaded? Will you be establising new programs or adding or dropping program staff? You also need to know the minimum and maximum cut-off numbers for teachers and programs. All these factors can affect the number of student spaces available to you.

- Are there students who will be mainstreamed?

In some vocational programs, slots are reserved for special-needs students; in others, the special-needs students are added after the regular slots have been filled. You need to know the local policy.

Mainstreamed students may need certain special equipment or facilities. They may need the lab area to be equipped for wheelchairs, etc. Early in the scheduling process, you should learn as much as possible about the requirements of all mainstreamed students so that appropriate facilities can be assigned and scheduled. For example, if you have a choice, you do not want to schedule classes in rooms that are far apart for a student who is in a wheelchair. Early consideration can help avoid this problem. In many institutions, the special needs students are hand scheduled by advisors or counselors to avoid problems.

- What student transportation factors are involved?

If students attend your secondary school for only a portion of the day, it is important for you to know if students are only available to you mornings or afternoons. This information can be critical to your schedule. For example, if you have 35 students that need welding in the afternoon, after 1:30, you need to be sure that (1) there are 35 welding stations in the afternoon, not the morning, and (2) there is sufficient time for students to be bussed or to drive from their home school. There are two excellent sources for this type of information. First, be sure to communicate with the people who do the scheduling for the feeder schools--make sure the morning/afternoon problems are identified early. Second, talk to the bus drivers or the director of

SAMPLE 1

COMPARING ADMISSIONS/REGISTRATION PROGRESS DATA

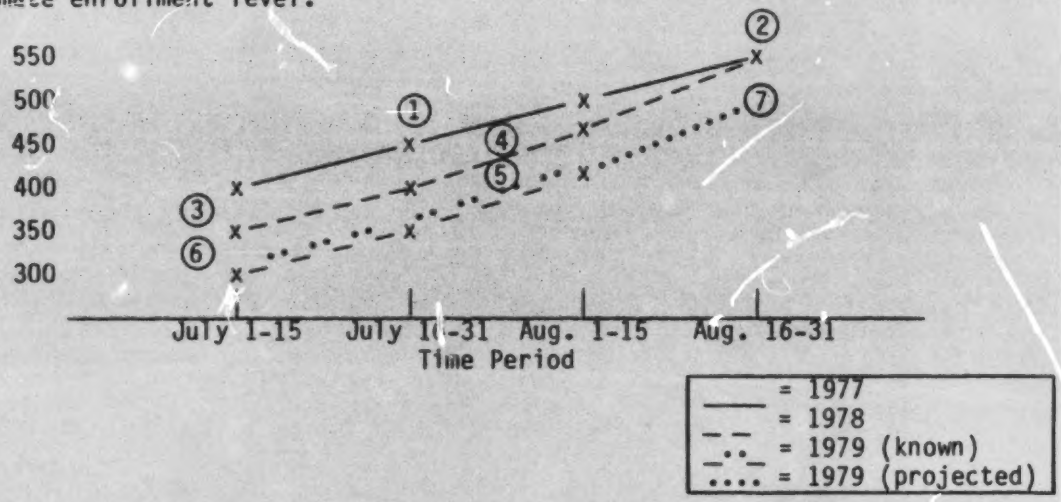
Many postsecondary and secondary institutions compare the progress of admissions or registrations from year to year as an aid to making enrollment predictions.

First of all, it is necessary for the admissions office or registrar to count completed applications or registration forms at fixed, frequent intervals. Then, tabular reports showing these data on a cumulative basis should be prepared. As of August 20, 1979, such a table might look like this:

Total Applications Received by Two-Week Period for 1977, 1978, 1979:

	1977	1978	1979
July 1-15	400	350	300
July 16-31	450	400	350
Aug. 1-15	500	475	425
Aug. 16-31	550	550	-

To aid your interpretation of these data, you should plot them as line graphs on the same sheet of paper. By comparing the shape of the graphs, and their relative positions, you can make an "educated guess" regarding the ultimate enrollment level.



This graph shows (1) that the 1977 admissions climbed evenly (50 every two-week period) to reach an ultimate level of (2) 550. The 1978 admissions had (3) lagged behind comparable 1977 periods by 50, but (4) surged upward during August to reach the same final total of 550.

Now it appears that the 1979 figures are also surging in August, (5) parallel to 1978; but, since they are (6) consistently below 1978 data by 50, then the projected end figure will be (7) only 500.

transportation. These people can give you approximate travel times, as well as the time needed for loading and unloading.

- Do certain programs require students to participate in internships or cooperative work experience?

  This information can indicate potential scheduling problems that are similar to those that can be caused by transportation. The scheduler must know when these outside experiences must take place and make calculations about travel time. Also, staffing must be looked at, since instructional staff often supervise outside learning and work experiences.

- Are there any other students or student circumstances that are unique to your school?

  For example, your school may house a displaced homemaker center, or you may have a group of retired workers returning for retraining. These two groups are often referred to as "nontraditional." They may need more flexible schedules or classes at other than usual times or places.

Staff

The instructor is the major element that will make or break the program, so the assignment process should be a careful one. You need to answer the following questions about your staff and staffing needs:

- What are the assignment preferences of your staff?

  All staff should be consulted about scheduling preferences and should be kept abreast of the scheduling decisions as they are made. The final assignments are made by the administrator and, if preferences cannot be granted, there should be a logical explanation and rationale for the decisions made. Negotiated agreements may complicate this process and restrict the flexibility of administrators in building the "best" master schedule. An open and honest communication process will assist in relieving frustrations and conflict with staff. Care should be taken to equalize regular instructional assignments and extra activity assignments so that teachers will know that every effort has been made to spread the work load equally. Ideally, department chairpersons can assist the administrator in charge of scheduling in assigning faculty to the schedule. Preliminary discussions and tentative assignments can often be handled at this level.

  Spreading the load and assignments equally does not necessarily mean assigning each instructor the same number of students or classes or preparations. Teachers with several preparations may have fewer students per class, while teachers with larger classes may have fewer preparations, or they may hold fewer class sessions but have more extra assignments. Teacher preference and ability should be taken into consideration in making assignments. Teachers should be responsible for

teaching in their areas of strength. It is rarely acceptable to ask a individual to teach in an area outside his/her certification merely in order to fill his/her schedule or to "cover a course." And ideally, the teacher who prefers advanced-level courses should be assigned there. If all teachers in an area prefer advanced courses, then the beginning and advanced courses could be divided equally so that everyone teaches some courses in their preferred area. One administrator suggested that the best teachers should be assigned the first-year students to decrease student attrition and to assure that all the fundamentals had been taught in preparation for the second-year program.

- What are the teacher certification requirements, negotiated contracts, and school policies under which your school operates?

  Teacher certification requirements, negotiated contracts, and school policies and procedures should be checked carefully in the teacher assignment process. Despite the cancellation of an assignment of a full-time instructor, the school may be required by contract to pay the instructor for a full-time assignment or load. If full-time instructors are given extra course assignments, the contract may specify that they need to be provided with overload pay. However, it may be less of a problem to later cancel an extra assignment given to a full-time teacher than to release an extra person employed to take that assignment. If the overload situation continues in subsequent terms, a part-time staff member may be employed at less cost than the overload pay. Part-time instructors may also be able to serve as substitutes when needed. Part-time staff are gaining widespread use, especially at the postsecondary level, in states where certification requirements do not prohibit their use.

  In most states an instructor may occasionally be asked to teach outside his/her major certified area. This helps you when there is one "odd" section that needs an instructor, but you need to be sure to check state regulations and local contract agreements before making such an assignment. This is not a desirable assignment choice, but one that may be necessary.

Facilities

You can schedule classes and teachers to your heart's content, but unless you have a place to put those classes and teachers, you can't operate a program. You need to consider the following questions about facilities:

- What facilities are available?

  The amount of facilities available for classes and laboratory activities is not measured solely by a room inventory. Equally important are the manner in which these rooms are scheduled and the degree to which they are filled during each session. If section sizes can be increased to near the capacity of a given room, then it will be used fewer hours during the day for a particular subject and is thus available for use

by other classes as well. This practice can thereby eliminate the necessity for seeking additional facilities through construction, remodeling, or rental.

In order to achieve maximum use of the facilities, you may wish to schedule laboratory classes so that second-year students use the labs during the morning and take their other courses in the afternoon. Then, first-year students will be able to use the laboratories in the afternoon. A similar relationship can be achieved by scheduling one section with lab on Monday and Wednesday and lecture on Tuesday and Thursday, and scheduling another section with those lab and lecture days reversed.

One way to augment the institution's inventory of space is to rent or lease facilities that can be adapted to suit your needs. This option is especially useful when installing a new program for a trial period during which the enrollment will be questionable, or when the building of new facilities is delayed for a period of time. Leasing a vacated service station may be a desirable option if you wish to provide hands-on experiences in the real world for second-year auto mechanics students. Vacant "storefront" facilities might serve a group of students with special needs who should have real experiences in dealing with the public while under school supervision before they seek a job in a commercial situation.

- What are the characteristics of available facilities?

Certain characteristics affect facility suitability for particular uses. For example, rooms with fixed desks might be suitable for lectures, but little else. On the other hand, rooms having movable chairs and tables are quite suitable for accounting or other courses in which students need ample room to spread out and work on materials, and they can be used for nearly any other purpose, too. Dental hygiene labs are quite restrictive, whereas biology or engineering labs can be made more flexible by providing basic workbench space, with specific apparatus available in peripheral storage cabinets for use during laboratory sessions. Remember that some class activities, especially those in trade and industrial specialties, involve noises, dust levels, or odors that might preclude the use of adjacent spaces for quieter kinds of activities.

- What building safety standards exist?

As you seek to match class or lab section sizes with available space, be sure that you consider those factors limiting room capacity. It can be dangerous--for fire and health reasons--to crowd too many students into any room. Laboratory and shop activities require ample elbow room, and in no case should the number of students exceed that which can be effectively and safely supervised by the laboratory instructor(s). Since the number of students that can be safely accommodated varies from program to program, you will want to consult building codes, OSHA standards, state education facility-use recommendations, and advisory committee members to learn which standards apply.

It is strongly recommended that you arrange through your resource person to meet with and interview an administrator with considerable experience in scheduling. Before the interview takes place, you should prepare a list of questions such as the following that you wish to have answered:

- How directly is he/she involved in the scheduling process?
- What other persons must he/she coordinate with in this process?
- What steps does he/she follow in developing a schedule?
- How are scheduling conflicts identified and solved?
- What aids does he/she use in the scheduling process (e.g., charts, conflict matrices, computer assistance)?
- What problems has he/she encountered and how can they be avoided or solved?

The following items check your comprehension of the material in the information sheet, "Factors Influencing the Design of a Master Schedule," pp. 9-15. Each of the six items requires a short essay-type response. Please respond fully, but briefly, and make sure you respond to all parts of each item.

SELF-CHECK

1. What are the major areas of information you must be familiar with before you begin to construct a master schedule?

2. Why is it necessary to know what courses are program requirements or prerequisites?

3. When designing the master schedule, why is it necessary to have good estimates of enrollment?

4. What special conditions are presented to the scheduler when cooperative education and internships are considered?

5. What does the scheduler need to know about staff before making assignments? Why?

6. Why is it essential to consider the characteristics of available facilities before scheduling?

Compare your written responses on the "Self-Check" with the "Model Answers" given below. Your responses need not exactly duplicate the model responses; however, you should have covered the same major points.

MODEL ANSWERS

1. Before beginning the construction of a master schedule, the scheduler should gather information about students, courses, staff, and buildings and equipment.

2. Schools and colleges are in the business of providing educational programs for students. Students are enrolled for a limited amount of time. The scheduler must carefully consider course requirements and prerequisites to ensure that each student is able to enroll in the needed courses at the appropriate time. Also, vocational courses must be coordinated with general studies courses that are required for graduation.

3. The number of students enrolled determines, among other things, whether or not a course will be offered. A good estimate also facilitates decisions about budget, room usage, and the number of needed instructional staff. The estimate should be as accurate as possible so that decisions based upon it do not need major revisions.

4. The off-campus experiences that enrich vocational education can cause difficulties for the person in charge of the master schedule. These experiences usually involve large blocks of time that are fairly inflexible. Not only do these experiences affect student scheduling, they also influence staff assignment when staff are expected to supervise the outside work experience.

5. The scheduler needs to know the following about the staff: (1) staff preferences, (2) staff qualifications, and (3) negotiated contracts and policies. If the staff are to feel comfortable with teaching assignments, their preferences should be carefully considered to equalize work load--both instructional and noninstructional duties. It is important to know what qualifications (certification) each instructor has so that each person teaches in his/her area of strength whenever possible. When not every class is covered by instructors with major certification, it may be possible to draw upon minor areas of certification possessed by other staff. Negotiated contracts and policies may dictate certain aspects of staff assignment such as class load, planning time, or overload pay that must be considered.

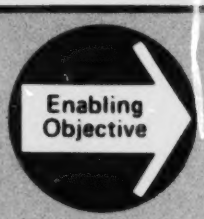
6. Part of building a master schedule is assigning classrooms. Classes and students have characteristics that influence the choice of rooms. Some classes need lab space, while others need movable tables and chairs.

Handicapped staff or students make accessibility essential. The scheduler also needs to know facility characteristics so that maximum usage can be obtained.

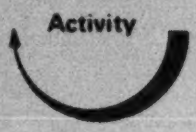
Level of Performance: Your completed "Self-Check" should have covered the same major points as the model responses. If you missed some points or have questions about any additional points you made, review the material in the information sheet, "Factors Influencing the Design of a Master Schedule," pp. 9-15, or check with your resource person if necessary.

Learning Experience II

OVERVIEW



After completing the required reading, interpret a conflict matrix, identify errors in a given master schedule, and develop a plan for resolving the identified discrepancies.



You will be reading the information sheet, "Constructing a Master Schedule," pp. 23-32.

You may wish to arrange through your resource person to obtain and examine master schedules from several schools and/or colleges.

You may wish to arrange through your resource person to locate and interview a commercial data systems consultant about use of the computer in scheduling.

You will be reviewing the "Conflict Matrix," pp. 33-34, and identifying the conflicts depicted, and proposing ways to minimize those conflicts.

continued

You will be evaluating your competency in identifying and solving schedule conflicts using a conflict matrix by comparing your completed interpretation with the "Model Interpretation," p. 35.

You will be reading the "Case Situation," pp. 37-38, and revising the given master schedule based on course offerings, student enrollments, available facilities, and staff qualifications.

You will be evaluating your competency in revising a master schedule by comparing your written critique with the "Model Critique, pp. 39-40.

Activity

For information about the process used to construct a master schedule, read the following information sheet.

CONSTRUCTING A MASTER SCHEDULE

The purpose of the scheduling process is to develop a master plan that will "provide classes for all who request them, at times when all can take them, taught by teachers best suited to teach them but assuring reasonable teaching assignments for each teacher, and in spaces best suited to the students, the subject, and the teacher."[1]

There are steps, tools, and procedures that can help you as an administrator in charge of constructing the master schedule. Every school and every school year is unique. Certain things can be predicted but not counted on. General steps, tools, and procedures are outlined here to help you as a beginner, but be prepared for priorities and procedures that are "accepted practice" in your institution that are not explained in this module.

Staff Involvement

When staff members are involved with the preliminary steps of constructing a master schedule they are more willing to make the compromises later on that are needed to make the schedule work. Staff members are also a major source of information about programs, courses, and students. The involvement of staff in constructing a master schedule is strongly recommended.

This is not to say that the administrator can turn over the schedule development process to a staff committee. One person can best do the actual schedule work and manage the information gathering. You cannot abdicate your decision-making responsibilities but don't overlook your department chairpersons as a valuable resource for preconstruction and as reality testers.

The Scheduling Process

The scheduling process is just that--a process. There are at least 12 steps that a scheduler needs to follow. These steps include the following:

1. Set priorities
2. Determine course offerings
3. Conduct a preregistration

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1. David B. Austin and Noble Gividen, The High School Principal and Staff Develop the Master Schedule (New York, NY: Columbia University, Teachers College, 1960), p. 64. © 1960 by Teachers College, Columbia University. Reprinted by permission of the publisher.

4. Determine number of course sections
5. Develop a conflict matrix
6. Develop course blocks
7. Use appropriate tools
8. Assign classes to time slots and rooms
9. Examine schedule for hidden inequities
10. Assign staff
11. Schedule students
12. Resolve conflicts

Set Priorities

To make decisions about which courses, teachers, and students have the first choice of time blocks in the master schedule, it is necessary to determine the relative importance of available alternatives. These priorities reflect policy and standard practice and may include the following:

- Commitments of teachers, facilities, or students (particularly those who are shared with other schools or agencies) may require that certain subjects be offered at a certain time or place. For example, one of the academic instructors may be shared between two buildings, or co-op students may need to be free for afternoon work assignments.
- Vocational versus academic courses may be an issue. You may be scheduling courses for only the vocational division or for the whole institution. A decision must be made about which area gets scheduling priority. Of course you as the vocational director will press for vocational courses obtaining appropriate scheduling priority. The decision must be made in light of the philosophy and policies of your total institution.
- Professional staff welfare or special needs should be recognized and addressed. A teacher with a health problem may need a rest time midday. Student activity responsibilities, committee assignments, or team teaching may make it desirable for several teachers to meet during a designated period. Vocational teachers may need certain periods free to supervise off-campus learning experiences or to deal with lab preparation.
- Vocational facility characteristics such as specialized laboratories must be considered when assigning classrooms. It may also be desirable to schedule classes away from certain classrooms during some periods of the day due to noise, dust, and so on, generated in an adjacent laboratory.
- "Singletons," courses that will be offered during only one period, will have more conflicts than will subjects offered two or three times a day. It is better to schedule singletons before scheduling

multi-period courses in order to avoid as many conflicts as possible. Also, courses that have enrollments across grade levels and are available to a large number of students will have more conflicts than specialized courses and need to receive priority in scheduling.

- Many times student organizations (VICA, FBLA, FFA, etc.) hold meetings during the school day. Space should be allotted for these activities. Consideration should be made for room sharing. It is not unusual to have 90 percent instructional and 10 percent activity usage, and this should be taken into account.
- Tradition may play a part in setting scheduling priorities. There may be more reason than "we have always held band fourth period." Pay attention to the history and extra activities and change these priorities with good reasons in mind in case you are called upon to defend your priorities.

Determine Course Offerings

After setting general priorities, you will need to decide what specific courses will be offered for the year. Some vocational courses may need to be offered alternate semesters or alternate years to ensure that students get their required courses, but the courses don't need to be offered every year. This is not the time to decide on the number of sections to offer. You may have an estimate or upper limit in mind but wait until after preregistration for sectioning.

Conduct a Preregistration

Have students select the courses they would like to take from the courses that are offered. This will give you a good estimate of enrollment in courses, as well as data for the assignment of teachers and the development of a conflict matrix. Preregistration data should be available to the scheduler in secondary schools by mid- to late spring. Postsecondary schools may not have as much lead time because of later registration dates. This preregistration data will not be entirely accurate because of dropouts, new enrollees, failures, and so on, but it's close enough to provide a baseline.

Your institution probably has a preregistration system. Familiarize yourself with the process and also the established timelines. Find out who conducts the preregistration. Is it done by home room teachers, by the guidance staff, or by a registrar or faculty advisors? You need to know the sources of your preregistration data in case you want to double check questionable information.

Determine Number of Course Sections

Based on your preregistration and/or admissions progress data (sample 1, p. 12) you can make decisions about the number of sections to be offered for

each course. Other facts that must be considered before making this decision are number of available staff and facilities, as well as budget constraints.

Some courses may need to be canceled because of insufficient students. Or sections may need to be added to the schedule to accommodate additional students.

One technique used by some school systems is that of "overscheduling," a practice of offering more sections than are likely to be scheduled. One advantage of this practice is that it allows you to present a wider latitude of choice for the student. It is generally easier to vacate a room or drop an instructional assignment than it is to locate an additional room or instructor. However, overscheduling necessitates painful decisions about which classes should be canceled and can lead to disappointed students who will need to be rescheduled into other courses. Caution should be exercised to avoid a "Catch-22" situation. If the state, school, or individual requires a particular class but because of low registration the class is cancelled, the student may be between a rock and a hard place.

Develop a Conflict Matrix

Using preregistration data, develop a conflict matrix to use as you build your schedule. The matrix is a cross-tabulation of all student course requests. It will tell the scheduler how many students who are taking one course are also taking another. It is not very likely that a student taking Welding I will also be taking Welding II (no scheduling conflict), but that student may be taking both Welding I and Business English (a potential conflict). Therefore, Welding I and Welding II could be scheduled in the same time period (providing they are not taught by the same instructor), but it would probably not be a good idea to schedule Business English and Welding I at the same time if many students are requesting both courses. Keep in mind that the conflict matrix will not resolve conflicts, but it will identify where the conflicts occur and how many there will be. Sample 2, "Constructing and Interpreting a Conflict Matrix," explains this tool. This step is often done by a computer, but to understand the process, it has been explained as if the matrix is to be hand constructed.

Develop Course Blocks

Develop course blocks for students with like needs who are enrolled in "tracked" (tightly sequenced) programs and can be prescheduled because of the nature of their programs. For example, if all first-year agriculture students must take four required courses, these four courses can be treated as a "course package." This practice is especially useful in vocational programs and can ease the burden of scheduling, especially when the programs are not run in conjunction with a comprehensive program. This is a good time to check to be sure minimum time requirements of the state are being met. Certain vocational courses need to be a specified length of time to qualify for vocational reimbursement.

SAMPLE 2

CONSTRUCTING AND INTERPRETING A "CONFLICT MATRIX"

Assume that there are only four students in your secondary or post-secondary school, and they have registered for the following six classes: Accounting 101, Business English 105, Math 121, Physics, 151, Psychology 110, and Typing 106. (You may arrange them in any order, but an alphabetical sequence makes it easier to find them.)

Their individual selections are:

Tom Fields: Accounting, Business English, Typing
Sally Jones: Business English, Math, Psychology
Juan Cruz: Business English, Math, Physics
Jerry Sheehan: Physics, Psychology, Typing

First, construct the outline of your matrix by drawing six columns x six rows, and label both with the names of the six courses.

Next, take the first student schedule (Tom Fields). Find the row corresponding with his first course choice (Accounting); make a tally mark (refer to the matrix which follows; we've used an "F" [for Fields] here to make it easy for you to follow along) in the column under "Accounting," and under each of his other two choices (Business English and Typing).

Now find the row corresponding to his next choice (Business English), and make tally marks in the column under Business English as well as his other two choices (Accounting and Typing). Finally, do the same for his last choice (Typing).

Follow this same procedure for the other three students' schedules.

You may wish now to replace the number of tally marks with arabic numbers.

The matrix can tell you two things--total enrollments and potential conflicts. By following along the diagonal line, you can determine the total number of students requesting each course (1 for Accounting, 3 for Business English, 2 for Math, etc.) All other "cells" show how many students want to take given pairs of courses (possible conflicts). For example, (a) two students want to take both Business English and Math, whereas there are (b) no students requesting both Accounting and Psychology, and (c) only one student wants both Psychology and Typing.

Therefore, you would try to schedule Business English by itself during one period, or else offer multiple sections at alternative periods. On the other hand, Accounting and Psychology could be offered during the same period, since they do not conflict with each other. If necessary, Typing might be scheduled "opposite" (at the same time as) Psychology, assuming that the student who had requested Typing could be advised to enroll in an alternate (non-conflicting) course instead (in this case, Accounting).

Go to sample 3 and examine the master schedule chart closely. You should be able to see that it accommodates all the conflicts posed by these four students' course requests.

Conflict Matrix for
Fields, Jones, Cruz, and Sheehan

	Acct.	B. Eng.	Math	Phys.	Psych.	Typing
Accounting 101	1 (F)	1 (F)	0	0	(b) 0	1 (F)
Business English 105	1 (F)	3 (F,J,C)	(a) 2 (J,C)	1 (C)	1 (J)	1 (F)
Math 121	0	2 (J,C)	2 (J,C)	1 (C)	1 (J)	0
Physics 151	0	1 (C)	1 (C)	2 (C,S)	1 (S)	1 (S)
Psychology 151	0	1 (J)	1 (J)	1 (S)	2 (J,S)	(c) 1 (S)
Typing 106	1 (F)	1 (F)	0	1 (S)	1 (S)	2 (F,S)

SAMPLE 3

WALL CHART FORMATS FOR TIME SCHEDULE, ROOM SCHEDULE TEACHER SCHEDULE, AND CORRESPONDING MASTER SCHEDULE

TIME SCHEDULE

	8-9 a.m.	9-10 a.m.	10-11 a.m.	11-12 a.m.	etc.
	M T W R F	M T W R F	M T W R F	M T W R F	etc.
Accounting 101			x x x x x		
Business English 105		x x x x			
Math 121	x x x x x				
Physics 151				x x x x x	
Psychology 110			x x x x		
Typing 106	x x x				
Etc.					

ROOM SCHEDULE

	8-9 a.m.	9-10 a.m.	10-11 a.m.	11-12 a.m.	etc.
	M T W R F	M T W R F	M T W R F	M T W R F	etc.
IH 16		Bus. Eng. 105 x x x x		Phys. 151 x x x x x	
IH 27	Math 121 x x x x x		Psych. 110 x x x x		
SLB 13	Typ. 106 x x x				
SLB 45			Acct. 101 x x x x x		
Etc.					

TEACHER SCHEDULE

	8-9 a.m.	9-10 a.m.	10-11 a.m.	11-12 a.m.	etc.
	M T W R F	M T W R F	M T W R F	M T W R F	etc.
Franks, Tom	Typ. 106 x x x		Acct. 101 x x x x x		
Nobel, Albert	Math 121 x x x x x			Phys. 151 x x x x x	
Young, Carla			Psych. 110 x x x x		
Zola, Emery		Bus. Eng. 105 x x x x			

MASTER SCHEDULE

Course	Days*	Time	Room**	Instructor
Accounting 101	M T W R F	10-11 a.m.	SLB 45	Franks
Business English 105	M T W R	9-10 a.m.	IH 16	Zola
Math 121	M T W R F	8-9 a.m.	IH 27	Nobel
Physics 151	M T W R F	11-12 a.m.	IH 16	Nobel
Psychology 110	M T R F	10-11 a.m.	IH 27	Young
Typing 106	M W F	8-9 a.m.	SLB 13	Franks

* M = Monday; T = Tuesday; W = Wednesday; R = Thursday; F = Friday
** IH = Ivy Hall; SLB = Smythe Laboratory Building

Use Appropriate Tools

Before starting the master scheduling process, it is advisable to secure the tools needed to carry out the process. Set aside a room (even if only temporarily) that provides privacy, some wall space for a time schedule, a room utilization schedule, and a teacher assignment schedule (see sample 3). Construct these charts using corkboard, acetate covered art board, magnetic panels, peg board, or a grooved wooden panel. Obtain also the tacks, grease pencils, metal tab holders, tags, or cards required for your preferred system. (A "room book" having an assignment chart for each room on a separate page is not useful here, since it does not display all parts of the "big picture" simultaneously. However, you may wish to use it later, after the schedule is finalized, as a handy portable reference for use in making space assignments for infrequent activities throughout the year.) You will also need a "conflict matrix" to help identify scheduling conflicts and then determine the schedule having the fewest conflicts.

Assign Classes to Time Slots and Rooms

Keeping priorities in mind and utilizing the best efforts to avoid conflicts, schedule the courses (onto the time chart) according to time or periods. Schedule single-section classes first in order to reduce the chance of conflicts. Do the same for classes that need to meet during specific periods because of outside limitations, or for classes that can use only one type of classroom or laboratory facility. Then, schedule other classes with a high potential for conflict. Finally, start scheduling all other classes following the previously established priorities (e.g., schedule senior-level classes before junior-level classes, and so on).

Assign a course to a room at the same time you assign it to a time period. This practice will immediately identify any conflicts that need to be resolved in terms of space requirements. It is desirable to keep a teacher in one room as much as possible, and this factor must be kept in mind when scheduling the rooms.

Examine Schedule for Hidden Inequities

This step occurs most often when developing a schedule for a comprehensive high school. Before you proceed, sit back and examine where you have placed introductory vocational classes. Hidden inequities can occur, for example, when you schedule the ninth grade girls' glee club opposite the only section of industrial arts or single sections of home economics opposite industrial arts. Scheduling home economics opposite industrial arts is a traditional approach in many schools. Usually there is no sound reason, "it's just how we've always done it." By varying levels, putting introductory home economics opposite advanced industrial arts, the scheduler provides more opportunity for students to register in a nonstereotyped manner.

There is nothing illegal about limiting choices for students but it is sound administrative practice to formulate schedules which broaden rather than limit student choice. As an administrator you also have an obligation to be equitable. This is one relatively easy way to help ensure equity.

Assign Staff

Assign staff within their areas of qualification, honoring any known preferences that can be accommodated. Post the teacher schedule chart simultaneously with the two schedules indicated earlier (time schedule and room schedule).

Schedule Students

Schedule students into the master schedule you have developed. Start with the students in their last year or quarter and work down. The test of the schedule comes when students' requests are programmed. The existence of too many conflicts means that schedule changes need to be considered and adopted. Be sure to record any changes on the time schedule, the room schedule, and the teacher schedule charts as they are made. Students may be loaded into classes in a variety of ways including the area method and computer loading. Use of the computer in scheduling is growing and is addressed in a later section of this information sheet.

Resolve Conflicts

Resolve remaining student, staff, or room conflicts. Some room assignments can be changed easily if little or no special equipment is required for the course (as in the case of recitation rooms). Some staff may be asked to accept assignments that were not their first preference. They should be encouraged to accept this situation as being in the best interests of the students and the overall instructional program. If the staff has been involved in the process and has been consulted as early as possible, this situation will result in a minimum of disappointment or bitterness. Many student conflicts can be resolved by using their second or third choice as indicated in preregistration or registration. In the final analysis, usually all conflicts cannot be resolved without some reassignments or some dissatisfied staff and students, but these conflicts and their consequences can be kept to a minimum.

Once you have completed all the steps outlined, you will have completed your first master schedule. Additional minor adjustments may need to be made after classes start, but the major job is completed.

Use of the Computer in Scheduling

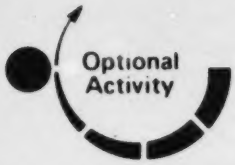
All of the steps listed previously must be taken in order to end up with a master schedule of courses. All or some of those steps can be completed with the help of a computer. You must remember, though, that a computer is only as smart as the person who programs it. If you don't tell the computer every decision point and every priority for every decision, the resulting master schedule will not be very satisfactory.

The most useful place in the scheduling process for computer assistance is in the conflict matrix development and loading of students into classes. Taking student choices from preregistration forms is much simpler when students have used mark-sensed sheets that the computer reads and converts into a conflict matrix. The computer can also easily update the conflict matrix as students make changes or new students are added during the preregistration period. This feature of computer scheduling can greatly reduce the clerical work loads of administrators, teachers, and guidance personnel.

After the master schedule is built, the computer can be given your enrollment priorities and can load students into classes with a minimum of effort. There will still be a few students with "impossible" schedules, but that happens whether or not you use a computer. The computer cannot "think" or "reason," it must follow the logic you lay out for it. Therefore, even if you use a computer in your scheduling process, you must understand all of the steps in the process in order to be able to give the computer good instructions.

Some people have worked with a computer to actually place classes, teachers, and rooms in a master schedule. It can be done, but most educators and computer people will tell you that a computer-generated master schedule is more work than it is worth. Someone must anticipate every decision and judgment that will be faced by the computer. By the time every detail has been identified and programmed into the computer, you could have built the schedule yourself.

You may already be using a computer in parts of the scheduling process. There are also consortiums of school districts, colleges, and commercial groups that offer a variety of computer services that include scheduling. As an administrator faced with the job of building a master schedule, you need to know and understand the process for building a master schedule outlined in this module, then decide if computer assistance in scheduling is appropriate or advantageous for your institution.



You may wish to gather and examine master schedules developed for other schools/colleges. Some of the things you may wish to think about are the following:

- Are there different formats? If so, do some seem more workable than others?
- Are the vocational courses scheduled so that enrollment in one area does not preclude enrollment in another?
- Can you find an error or major problem? If so, can you improve on the schedule?

You may wish to locate a commercial data systems consultant to interview about computer use in scheduling. Some questions you might consider asking are the following:

- What services does your company provide to schools/colleges?
- What are some of the advantages and disadvantages of using computers in scheduling?
- What is the cost per student to use a computer scheduling service?
- How much time must be spent by administrators in setting up a computer assisted system?

The following "Conflict Matrix" represents the course requests of about 20 students at Walnut Grove Vocational School. Interpret this chart, being sure to include the following:

- Identification of the course with the highest projected enrollment and the course with the lowest
- Identification of the courses and course pairs encountering many conflicts, and those encountering few, if any, conflicts
- A proposal for pairings or grouping of courses that could be scheduled for the same time period

CONFLICT MATRIX

WALNUT GROVE VOCATIONAL SCHOOL MATRIX CHART

	T & I			GENERAL						CO-CURRICULAR		
	Auto Mech.	Basic Elect.	TV Repair	Am. Govt.	Am. Hist.	Biol.	Bus. Eng.	Bus. Math	Eng. Comp.	Debate	Glee Club	Phys. Ed.
Auto Mechanics (2 hours)	4	0	0	0	0	1	4	3	0	0	1	5
Basic Electronics	0	5	4	1	1	1	4	2	3	1	3	0
TV Repair (2 hours)	0	4	6	0	5	2	6	0	0	4	3	1
American Government	0	1	0	8	0	1	5	3	10	0	6	4
American History	0	1	5	0	8	0	8	2	6	5	3	2
Biology	1	1	2	1	0	5	1	5	2	2	0	3
Business English	4	4	6	5	8	1	8	0	0	2	0	3
Business Math	3	2	0	3	2	5	0	6	2	2	0	3
English Comp.	0	3	0	10	6	2	0	2	9	6	2	3
Debate	0	1	4	0	5	2	2	2	6	7	4	1
Glee Club	1	3	3	6	3	0	0	0	2	4	6	4
Physical Education	5	0	1	4	2	3	3	3	3	1	4	7

Compare your completed interpretation of the "Conflict Matrix" with the "Model Interpretation" given below. Your response need not exactly duplicate the model response; however, you should have covered the same major points.

MODEL INTERPRETATION

- English Composition has attracted the most requests (nine), whereas Auto Mechanics has attracted only four.

- Many confcts can be expected between American Government and English Composition, between American History and Business English, between Business English and TV Repair, and between American History and English Composition. On the other hand, Auto Mechanics conflicts with very few courses, and Business Math and Glee Club are also relatively free from heavy conflicts. American Government does not conflict with American History, nor does Business English conflict with English Composition.

- It would appear that the best solution would be to schedule Auto Mechanics opposite Debate and American History. This would result in no conflicts. Schedule Basic Electronics opposite Physical Education (no conflict) or American Government, American History, Biology, and Debate (conflict of only one student.) Scheduling TV Repair opposite Business Math and English Composition or opposite American Government would result in only one confict, but the vocational administrator must be aware that other departments have serious conflicts. English Composition and American Government have ten students in conflict; consequently, they could not be scheduled for the same period. The solution for the vocational classes is relatively easy, but the master schedule maker will have some difficulty in resolving all the conflicts in the schedule. All departments must be prepared to live with some conflicts.

Level of Performance: Your completed interpretation of the matrix--identification of conflicts, proposals for eliminating conflicts--should have covered the same major points as the model response. If you missed some points or have questions about any additional points you made, review the material in the information sheet, "Constructing a Master Schedule," pp. 23-32, or check with your resource person if necessary.

NOTES

The following "Case Situation" is designed to check your ability to revise schedules based on course offerings, student enrollments, available facilities, and staff qualifications.

Read the sample master schedule that follows, and study the projected enrollments, room descriptions, and instructor qualifications. Also, consult the sample conflict matrix used in the previous activity. Then, locate at least five of the seven "induced errors" (unworkable assignments). Finally, develop a plan for resolving these discrepancies (change times, rooms, faculty assignments, or all three).

HINT: Construct three small charts for the time, room, and instructor schedules, and transfer the information from the master schedule to them. This will help you to see conflicts, and possible solutions, more readily. The charts might look like this:

(course, room, or teacher)	Period 1	2	3	4	5	6

CASE SITUATION

Walnut Grove Vocational School Master Schedule

Course	Period	Room	Instructor
Auto Mechanics	4 & 5	10	Ms. Kissel
Basic Electronics	6	20	Mr. Luther
TV Repair	4 & 5	20	Mr. Luther
American Government	1	28	Mr. Martinez
American History	1	33	Ms. Kissel
Biology	3	20	Ms. Kissel
Business English	2	33	Ms. Kissel
Business Math	3	33	Mr. Luther
English Composition	1	15	Mr. Luther
Debate	6	33	Mr. Martinez
Glee Club	3	15	Mr. Martinez
Physical Education	6	33	Ms. Nassau

Projected Enrollments

Auto Mechanics - 20
Basic Electronics - 25
TV Repair - 30
American Government - 40
American History - 40
Biology - 25
Business English - 40
Business Math - 28
English Composition - 32
Debate - 21
Glee Club - 36
Physical Education - 35

Room Descriptions

10 - A large, open workshop with overhead doors, hoists, parts bins, welder, 25 movable tablet-arm chairs; not well soundproofed

15 - Conventional classroom with 40 movable tablet-arm chairs, located across the hall from Room 10

20 - Laboratory with smooth-top benches, lots of electrical outlets, sinks at end of each bench, ample storage space for specimens, test apparatus, etc.; thirty stools for seating

28 - Another recitation room just like Room 15, but furnished instead with portable, folding tables and 40 portable, stacking chairs

33 - A lecture room where the chairs are fixed in rows and have folding tablet arms; includes a raised platform at the front of the room, with a lectern, two tables, and six chairs

Instructor Qualifications

Joan Kissel has a B.A. in history and English. Her hobby of auto racing led to her purchasing a small auto repair shop, which she owned for 15 years before joining WGVS. As a diabetic, she must maintain a regular meal schedule. Certification Areas: social studies, English, vocational--T & I (automotive)

Jason Luther holds a B.S. and M.S. in electrical engineering, but claims he never would have finished grad school without the help of his wife who edited his brilliant, but poorly written, thesis. Certification Areas: mathematics, vocational--T & I (electronics)

Miguel Martinez is a former state legislator, who served for a while as speech writer and publicist for the governor. He recently has suffered some loss of hearing, but claims he "always was tone deaf." Certification Areas: social studies, English (communications)

Frieda Nassau describes herself as a "Renaissance woman." She lettered in gymnastics, volleyball, and golf at the state university, and did her M.S. research there in human physiology. She also directs the choir at the local Presbyterian church and is an avid photographer. Certification Areas: biology, music, physical education

Compare your completed written critique of the hypothetical master schedule provided in the "Case Situation" with the "Model Critique" given below. You should have identified five of the seven errors explained below. Your solutions should be similar to the solutions provided in the model, covering the same major points.

MODEL CRITIQUE

Biology--Two errors:

- It shares five conflicts with Business Math and Glee Club.
- It is taught by an unqualified instructor (who is scheduled for classes in Periods 1-5, thus having no free period for the lunch that her illness requires).

Solutions:

- Move Biology to first period where it has only one conflict, with American History (English Composition will be switched out of first period, see below).
- * Assign this class to Ms. Nassau.

Business Math--One error:

- It is likely that students need more room to work than is available on the tablet arms of their chairs.

Solutions:

- Move this class to Room 28, where tables are available.

English Composition--Three errors:

- This class shares 16 conflicts with American Government and American History.
- It meets in a room right across from a noisy shop.
- The instructor is not qualified.

Solutions:

- Move this class to second period, where it does not conflict with Business English.
- Move it to Room 28, farther from noise.
- * Assign Mr. Martinez to teach the course. (Although this will still leave Mr. Luther with four consecutive classes in Periods 3-6; he'll have to eat lunch early.)

Glee Club--One error:

- Mr. Martinez obviously is not qualified to direct this activity.

Solution:

* Assign Ms. Nassau to direct Glee Club.

Physical Education--One error:

- The schedule maker's "pencil slipped," and this class is accidentally given the same room that Debate is using.

Solution:

- Since Room 33 seems well suited for Debate, move Physical Education to Room 15 or 28 (that is, for use when the class is not in the gym or outdoors).

Overall--One error:

- The teaching loads are unequal: Kissel - four classes; Luther - four classes; Martinez - three classes; Nassau - one class.

Solution:

- The changes made in solutions 2, 6, and 7 above (marked with asterisks) will leave all four teachers with three classes each.

Level of Performance: In your completed critique, you should have identified at least five of the seven errors listed in the model. Your proposed solutions to these errors should have covered the same major points as the model solutions. You may have reached some solutions different from those described in the model. These may be satisfactory, too, as long as they don't generate new, more serious conflicts or unworkable assignments. If you missed some errors or solutions or have questions about additional points you made, review the material in the information sheet, "Constructing a Master Schedule," pp. 23-32, or check with your resource person if necessary.

Learning Experience III

FINAL EXPERIENCE

While working in an actual administrative situation, manage the development of master schedules.*

As part of your administrative responsibility, construct and implement a master schedule for course offerings, staff assignments, and classroom assignments. This will include--

- gathering information about students, courses, staff, and facilities
- setting priorities
- conducting a preregistration
- constructing a conflict matrix
- constructing a final schedule
- loading students into classes

NOTE: As you complete each of the above activities, document your activities (in writing, on tape, through a log) for assessment purposes.

continued

*If you are not currently working in an actual administrative situation, this learning experience may be deferred, with the approval of your resource person, until you have access to an actual administrative situation.

FINAL EXPERIENCE continued

Arrange to have your resource person review any products developed under your leadership, and the documentation of your activities. If possible, arrange to have your resource person observe one instance in which you work with instructors or other administrators to construct a master schedule.

Your competency will be assessed by your resource person, using the "Administrator Performance Assessment Form," pp. 43-44.

Based on the criteria specified in this assessment instrument, your resource person will determine whether you are competent in constructing a master schedule.

Name _____

Date _____

ADMINISTRATOR PERFORMANCE ASSESSMENT FORM

Manage the Development of Master Schedules

Directions: Indicate the level of the administrator's accomplishment by placing an X in the appropriate box under the LEVEL OF PERFORMANCE heading. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

	LEVEL OF PERFORMANCE					
	N/A	None	Poor	Fair	Good	Excellent
In managing the scheduling process, the administrator:						
1. gathered information pertinent to scheduling about the following factors:						
a. the courses (required, elective) the institution plans to offer.....	☐	☐	☐	☐	☐	☐
b. the projected student enrollment figures for the current year.....	☐	☐	☐	☐	☐	☐
c. available facilities, by instructional area.....	☐	☐	☐	☐	☐	☐
d. available staff, by instructional area.....	☐	☐	☐	☐	☐	☐
e. minimum time required by state and local regulation.....	☐	☐	☐	☐	☐	☐
f. the schedule of academic and vocational courses required by students.....	☐	☐	☐	☐	☐	☐
g. limits, such as transportation, on the students' time flexibility.....	☐	☐	☐	☐	☐	☐

	LEVEL OF PERFORMANCE					
	N/A	None	Poor	Fair	Good	Excellent
2. obtained and made available all necessary scheduling tools (e.g., a room, scheduling charts, writing instruments, computer time.....	☐	☐	☐	☐	☐	☐
3. identified scheduling priorities.....	☐	☐	☐	☐	☐	☐
4. managed development of a final schedule of students, staff, and room assignments by course, based on actual enrollment data.....	☐	☐	☐	☐	☐	☐
5. identified and minimized or resolved schedule conflicts and problems.....	☐	☐	☐	☐	☐	☐
6. involved appropriate staff members in the scheduling process.....	☐	☐	☐	☐	☐	☐
7. produced a final vocational schedule that:						
a. was reasonably free of conflicts.....	☐	☐	☐	☐	☐	☐
b. met most students' needs and preferences...	☐	☐	☐	☐	☐	☐
c. provided staff with equitable assignments in their areas of certification.....	☐	☐	☐	☐	☐	☐
d. scheduled courses into rooms appropriate for the activities required.....	☐	☐	☐	☐	☐	☐
e. was coordinated with the total institutional and extra-institutional schedules...	☐	☐	☐	☐	☐	☐

Level of Performance: All items must receive N/A, GOOD, or EXCELLENT responses. If any item receives a NONE, POOR, or FAIR response, the administrator and resource person should meet to determine what additional activities the administrator needs to complete in order to reach competency in the weak area(s).

Additional Recommended References

Allen, Dwight W., and DeLay, Donald. *Flexible Scheduling: A Reality.* Stanford, CA: Stanford University, School of Education, n.d. ED 027 624

Barton, David W., Jr., ed. *Marketing Higher Education.* New Directions for Higher Education Quarterly Sourcebook, Number 21. San Francisco, CA: Jossey-Bass Publishers, Spring 1978.

Berquist, Robert. *Computer Scheduling Educational Reform: Using S⁴—The Stanford School Scheduling System.* Stanford, CA: Stanford University, School of Education, School Planning Laboratory, n.d. ED 018 960

Davis, Harold S., and Bechard, Joseph E. *Flexible Scheduling.* In-Service Education and Staff Utilization Series. Cleveland, OH: Educational Research Council of America, 1968. ED 022 254

Flexibly Scheduled School of 1980: A Report of the National Seminar on Modular Flexible Scheduling. An I/D/E/A Occasional Paper. Dayton, OH: Institute for Development of Educational Activities, 1970. ED 052 543

Johnson, Sharon Counts. *Flexible-Modular Scheduling.* Educational Management Review Series Number 4. Eugene, OR: University of Oregon, ERIC Clearinghouse on Educational Management, 1972. ED 061 580

Logan, Nelson Stanley. *Master Schedule Building and the Flexibly Scheduled School.* Salt Lake City, UT: University of Utah, Computer Center, 1970. ED 081 112

Quann, C. James et al. *Admissions, Academic Records, and Registration Services: A Handbook of Policies and Procedures.* The Jossey-Bass Series in Higher Education. San Francisco, CA: Jossey-Bass Publishers, 1979.

Competency-Based Administrator Education Materials

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- Guide to Vocational-Technical Education Program Alternatives: Secondary and Postsecondary—An Introduction
- Guide to Using Competency-Based Vocational Education Administrator Materials
- Resource Person's Guide to Implementing Competency-Based Administrator Education Concepts and Materials
- An Introduction to Competency-Based Administrator Education (slide/audiotape)

For information regarding availability and prices of these materials contact—AAVIM, American Association for Vocational Instructional Materials, 120 Driftmier Engineering Center, University of Georgia, Athens, Georgia 30602, (404) 542-2586.

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